



## The European Satellite Navigation Programmes

# EGNOS and Galileo

Dominic HAYES, European Commission

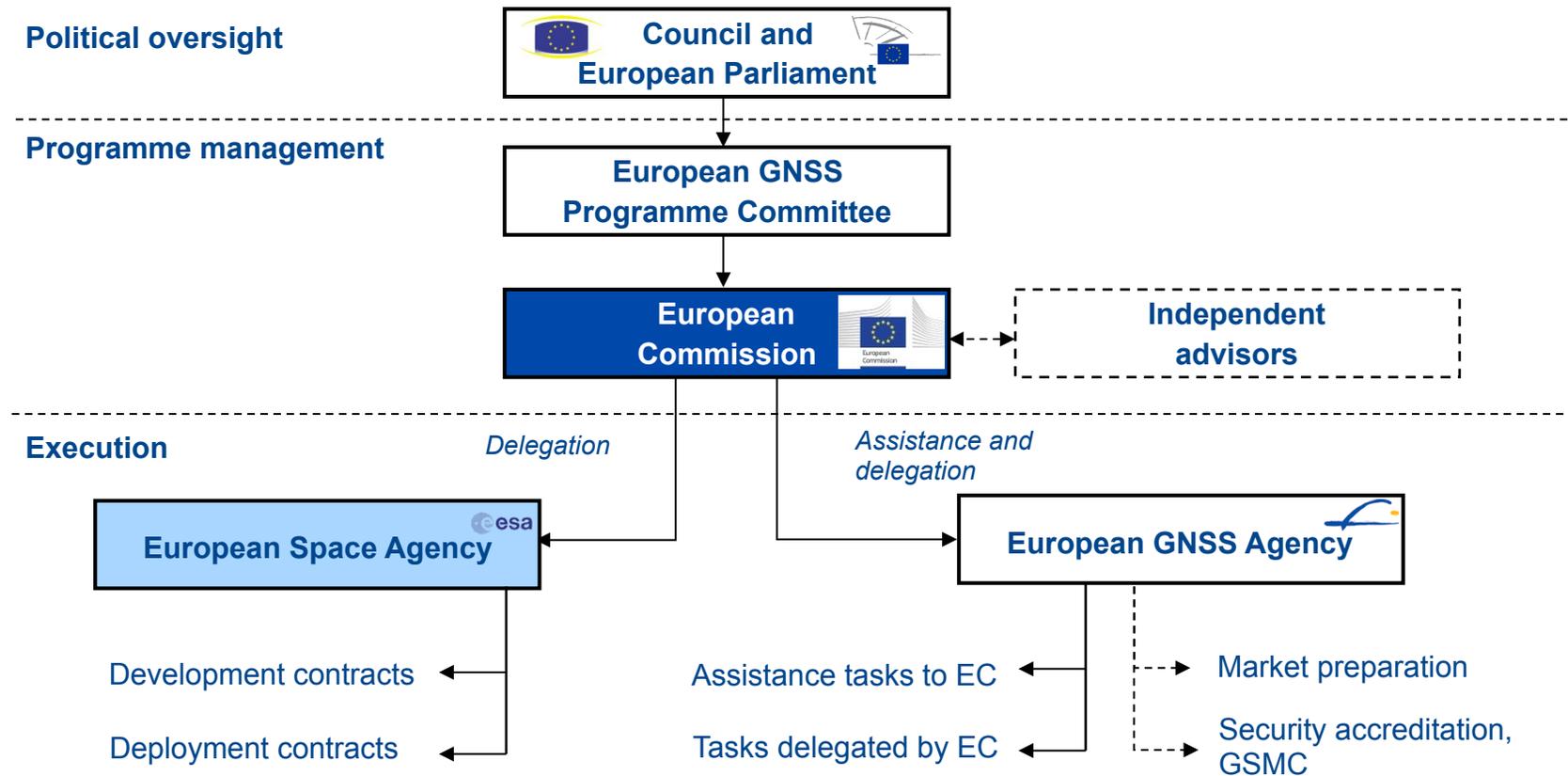
WG-A Meeting, Olsztyn, July 2012





# Galileo governance

## The GNSS Regulation entrusts the European Commission with the role of programme manager



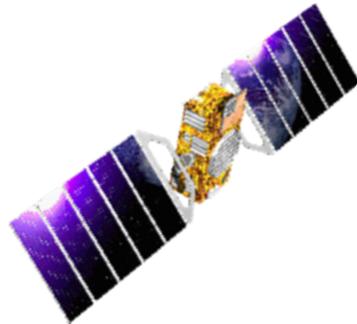
GSMC: Galileo Security Monitoring Centre

# Galileo implementation plan



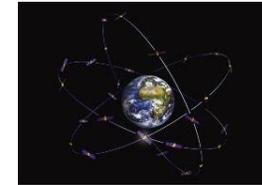
Navigation solutions powered by Europe

**Galileo is implemented  
in a step-wise approach**



**Full Operational Capability**  
Full services, 30 satellites  
**2018**

**Initial Operational Capability**  
Early services for OS, SAR  
Pilot project for PRS and demonstrator for CS  
**2014**



**In-Orbit Validation**  
4 fully operational satellites and  
ground segment  
**2012**



**GIOVE A/B**  
2 test satellites  
**2005/2008**

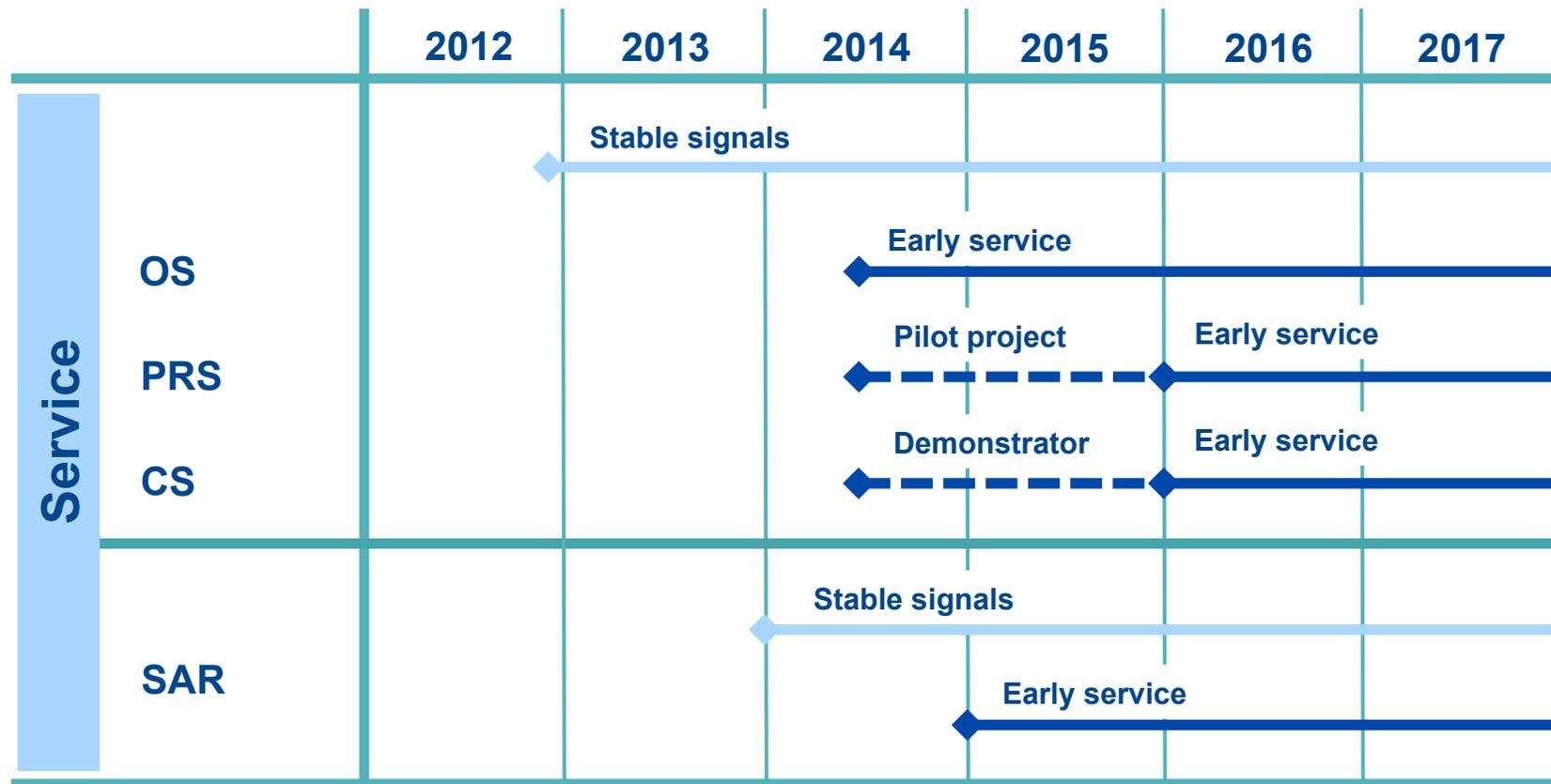


**Galileo System Testbed v1**  
Validation of critical algorithms  
**2003**



# Galileo services provision timeline

**Early services will be provided from 2014 with a gradual transition towards full services as more satellites become available**



## Early services for OS and SAR will be provided from 2014

|  |  |   |
|--|--|---|
| <b>Open Service (OS)</b>               | Freely accessible service for positioning and timing                           |    |
| <b>Public Regulated Service (PRS)</b>  | Encrypted service designed for greater robustness and higher availability      |    |
| <b>Search and Rescue Service (SAR)</b> | Assists locating people in distress and confirms that help is on the way       |   |
| <b>Commercial Service (CS)</b>         | Delivers authentication and high accuracy services for commercial applications |  |

The SoL service is currently being re-profiled

|                                     |   |   |
|-------------------------------------|---|---|
| <b>Safety of Life Service (SoL)</b> | Provides vital integrity information for life-critical applications |  |
|-------------------------------------|---|---|

# Galileo is taking off



Navigation solutions powered by Europe



- ★ First 2 **operational satellites** launched 21 October 2011 (in addition to the two test satellites launched in 2005 and 2008)
- ★ New satellites transmitted E1 signals 10 December 2011, and E5, E5a and E5b signals 14 December
  - ★ (existing E1, E5, E6 signals from GIOVE-A since December 2005)
- ★ The launch of the next two Galileo satellites, completing the IOV quartet, is scheduled for **October 2012**.
- ★ All **industrial contracts** necessary to ensure early Galileo services in 2014 have been signed
- ★ To **accelerate Galileo's deployment** and to further contain costs, the following contracts were signed on 2 February 2012:
  - ★ Additional order for 8 satellites
  - ★ Adaptation of Ariane-5 for Galileo (4 sats/launch)
  - ★ Booking of one Ariane-5

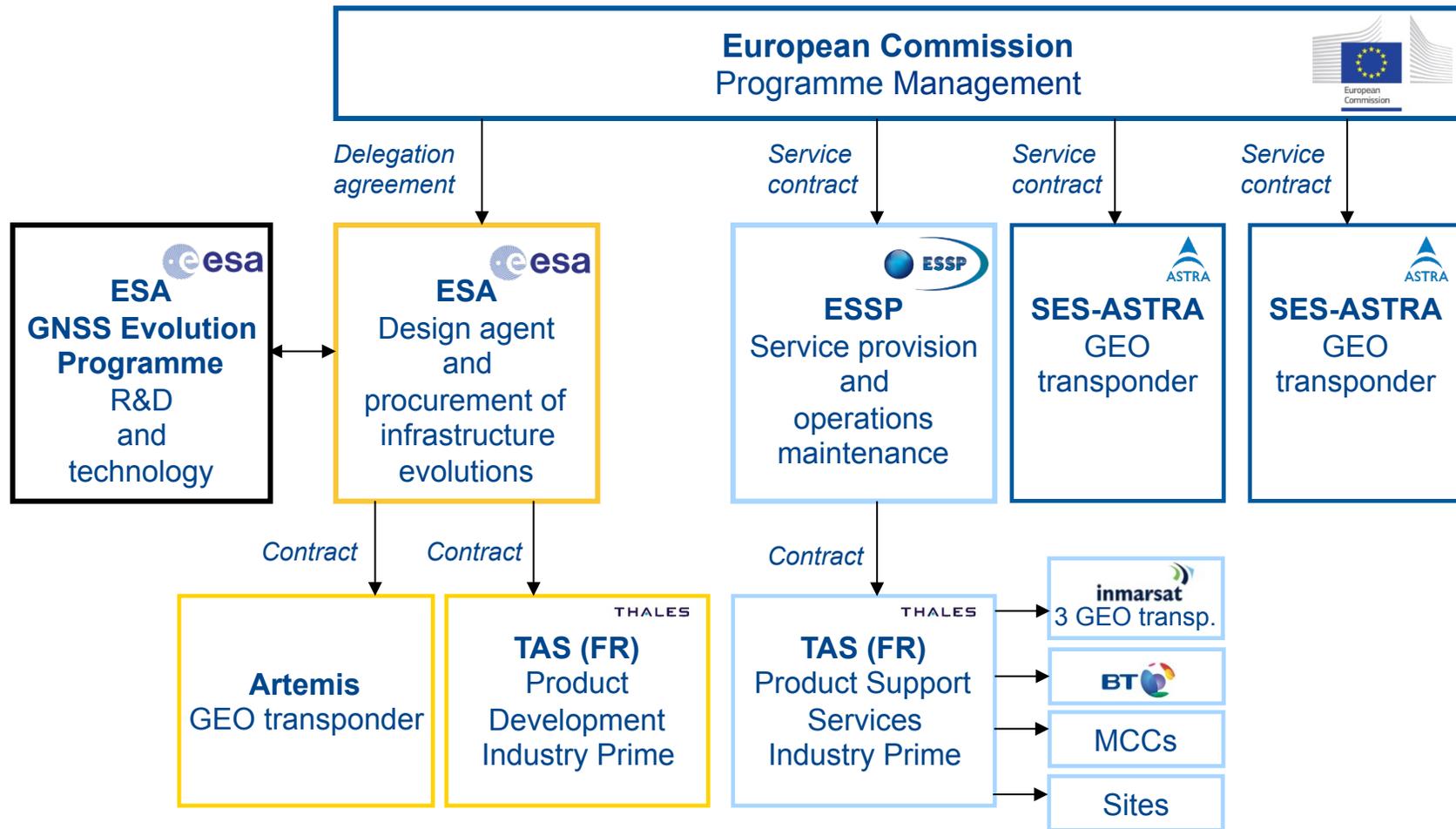


**EGNOS**

**'It's there, use it'**

# EGNOS organisation

## The European Commission is the EGNOS programme manager



GEO: Geostationary Earth Orbit    MCC: Mission Control Centre

## EGNOS services will be delivered on a long-term basis (> 20 years)

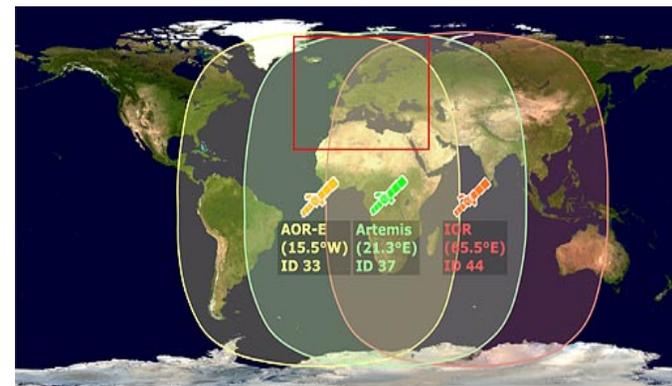
|   |  |                                 |  |
|---|--|---------------------------------|--|
| <b>Open Service (OS)</b>                | Accuracy ~1m, free   | Available since October 2009    |   |
| <b>Safety of Life Service (SoL)</b>     | Accuracy ~1m, compliant to aviation standards              | Available since March 2011      |   |
| <b>EGNOS Data Access Service (EDAS)</b> | Accuracy <1m, corrections provided by terrestrial networks | Experimental service since 2008 |  |

# EGNOS is fully operational



Navigation solutions powered by Europe

- ★ **EGNOS open service is operational** since October 2009
- ★ Its **Safety of Life** service has been declared operational in March 2011
- ★ In May 2011, Pau Pyrénées airport (France) became **Europe's first airport to use the EGNOS Safety of Life service** to guide in aircraft for landing
- ★ Since December 2011, the EGNOS-based LPV procedures at Alderney airport (Channel Islands) are the first in Europe able to being used for **revenue services in commercial flights**
- ★ Around **100** EGNOS approach procedures for aircraft landings already published in Europe
- ★ New EGNOS payload was launched July 2012 (hosted on SES-5 satellite)



LPV: Localizer Performance with Vertical guidance

## EGNOS services will further improve over time

### 2012

- ★ Declare EGNOS coverage extension for 11 EU countries\*
- ★ Provide early EGNOS Data Access Service (EDAS)

### Medium term

- ★ Implement LPV200 service level
- ★ Extend coverage to South Africa

### Long term

- ★ Make use of E5a/E5b frequencies
- ★ Implement augmentation of Galileo and potentially other GNSS

LPV: Localizer Performance with Vertical guidance  
\* CZ, EE, HU, IE, LV, LT, PT, RO, SK, ES, UK